PENCIL SKETCHES OF COLORADO

MATHEWS.

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PENCIL SKETCHES

OF

COLORADO,

ITS CITIES, PRINCIPAL TOWNS AND MOUNTAIN SCENERY.

BY

A. E. MATHEWS.

1866.

ENTERED according to Act of Congress, in the year 1868 by

A E MATHEWS

In the Clerk's Office of the District Court of the United States for the Southern District of New York

PREFACE.

The author herewith offers to the public a collection of lithographed sketches of Colorado, embracing its Cities, and most of its Principal Towns, together with some of the beautiful Mountain Scenery which abounds in this incomparable territory

A volume like this cannot be expected to contain all the points of beauty and interest in the territory, indeed it would require many such to illustrate the scenery of Colorado, but it has been the aim of the artist principally to represent that portion of the country to which interest is attached on account of the rich gold and silver mines; and, if possible, to give non-residents an idea of the beauty and grandeur of the natural scenery in the mountains, which will compare favorably, in this respect, with any in the world.

Denver, May, 1866

This work is not intended to contain a history of the country, but only a short description to accompany the illustrations, it is merely a collection of lithographed sketches bound together for convenience, and being in book form it is necessary that some description of the country and localities represented should be given For this reason it is hoped the public will excuse all imperfections that may be contained in the letterpress, and that the illustrations will be found sufficiently accurate to compensate for any deficiency in this respect

The author here offers his sincere thanks to his friends, and other citizens of Colorado, for the numerous kindnesses and courtesies extended to him while making these sketches.

Lith. by J. Bien N.Y.

Entered according to Act of Congress in the year 1858, by A. R. Mathews, in the Clerk's Office of the District Court [illegible] New York.

A. R. Mathews, Del

DENVER,

CITY OF THE PLAINS.

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A. E. Mathews, Del

BLAKE STREET, DENVER, COLORADO.

LARAMIE STREET, DENVER.

Lith by J. Bien N.Y.

Entered a[illegible] year 1850 by A. E. V[illegible] Southern District of New Yo[illegible]

A. E. Mathews, Del

GOLDEN CITY.

...ar 1838, by A. E. Mat...th's Office of the District Court of the United States for the Southern District of New York.

A. E. Mathews, Del

...ith by J. Rose N.Y.

BLACK HAWK,

LOOKING UP GREGORY AND CHASE'S QULCHES.

Lith. by J. Bien N.Y.

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A. B. Mathews, Del

CENTRAL CITY;

FROM THE SIDE OF MAMMOTH HILL LOOKING UP GREGORY AND EUREKA GULCHES.

Lith by J Bien N Y

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A. E. Mathews, Del.

CENTRAL CITY;

LOOKING UP SPRING GULCH.

Lith by J Bien N Y

Entered according to Act [illegible] year 1870, by A. R. Mathews [illegible] Clerk's Office of the District Court of the United States for the Southern District of N w York.

A. R. Mathews Del.

NEVADA, COLORADO.

RUSSELL GULCH, GILPIN COUNTY.

Lith. by J. Bien N. Y. Entered according to Act of Congress, in the year 1866, by A. E. MATHEWS, in the Clerk's Office of the District Court of the United States for the Southern District of New York. A. E. Mathews, Del.

THE CHIEF, SQUAW AND PAPOOSE,

AS SEEN FROM IDAHO

CLEAR CREEK COUNTY

Entered ... N. Y. Entered according to Act of Congress ... the year 1860, by A. F. Mathews in the Clerk's Office of the District Court of the United States for the Southern Dis... N. Y. A. F. Mathews Del

FALL RIVER, CLEAR CREEK COUNTY.

THE OLD MOUNTAINEER, FALL RIVER

Lith. by J. Bien N.Y. Entered according to Act of Congress in the year 1846, by A. E. Mathews in the Clerk's office of the District Court of the United States for the Southern District of New York. A. E. Mathews, Del.

PROFILE ROCK, FALL RIVER.

EMPIRE CITY, CLEAR CREEK COUNTY.
FROM NEAR THE FOOT OF SILVER MOUNTAIN LOOKING TOWARDS ELIZABETHTOWN

Lith. by [illegible] N.Y.

Entered according to Act of Congress in the year 1868, by A. E. Mayhew in the Clerk's Office of the District Court [illegible]

A. E. Mayhew, Del

ELIZABETHTOWN, CLEAR CREEK COUNTY
FROM THE GRIFFITH TUNNEL.

Lith by J. Bien N.Y.

Entered ... 1868, by A. B. Mathews, in the Clerk's Office of the District Court ... Southern District of New York

A. B. Mathews, Del

SOUTH PARK.

Lith by J. Bien N.Y.

Entered [illegible] N. E. Mayhews, in the Clerk's Office of the District [illegible] of the United States for the Southern District of New York.

N. E. Mayhews Do

MOUNT LINCOLN.

Entered ... in 1866, by A. E. Mathews, in the Clerk's Office of the District ... of New York.

A. E. Mathews, Del.

TWIN LAKES.

...ber 1858, by S. A. Mathews, in the Clerk's Office of the District Court of the United States for the Southern District of N...

S. F. Mathews, Del.

PIKE'S PEAK AND COLORADO CITY.

Lith. by J. Bien, N.Y.

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A. R. Mathews Del.

GARDEN OF THE GODS.

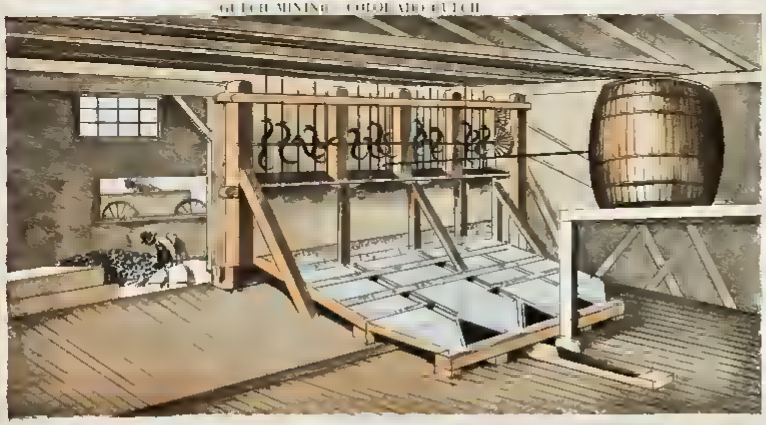
Lith. by J. Bien, N.Y.

A. K. Mayhew, Del

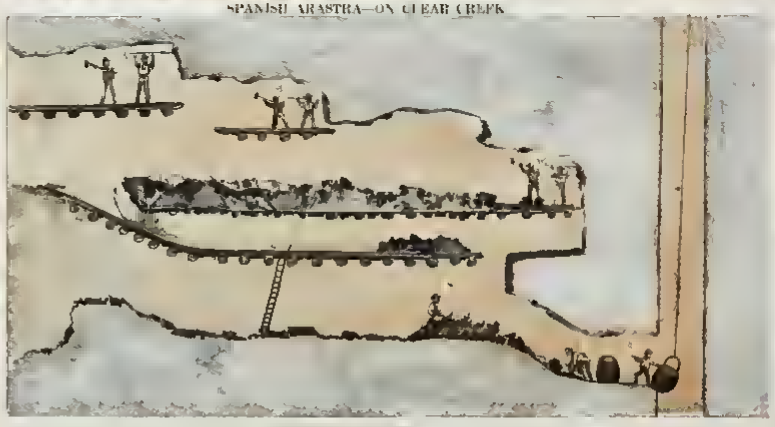
MONUMENTS, NEAR MONUMENT CREEK.

GULCH MINING—CROOK AND GULCH

SPANISH ARASTRA—ON CLEAR CREEK



THE STAMP PROCESS—MR SENSENDERFER'S MILL



SHAFT OR LODE MINING—INTERIOR OF N[illegible] ON THE GREGORY THE BLACK HAWK CO S MINE

[illegible] by J. Bien, N. Y.

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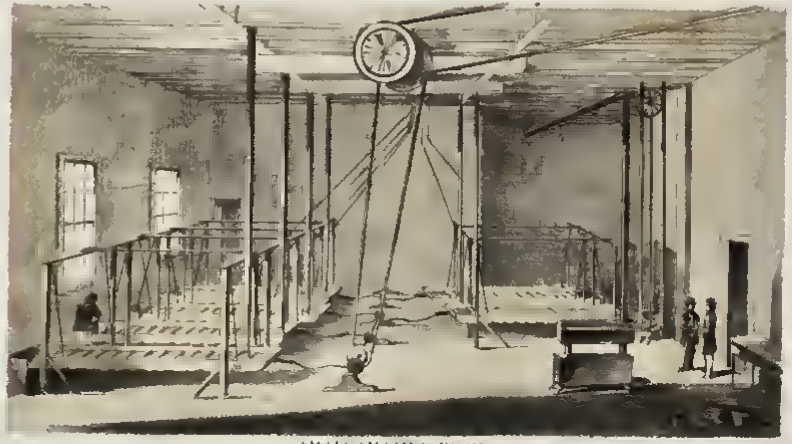
A. E. Mathews, Del

THE ORE BREAKING ROOM —BLAKE'S ORE BREAKER

THE FURNACE

THE ORE PIT OR DRYING ROOM



AMALGAMATING ROOM

Lith by J. Bien & Co. N.Y.

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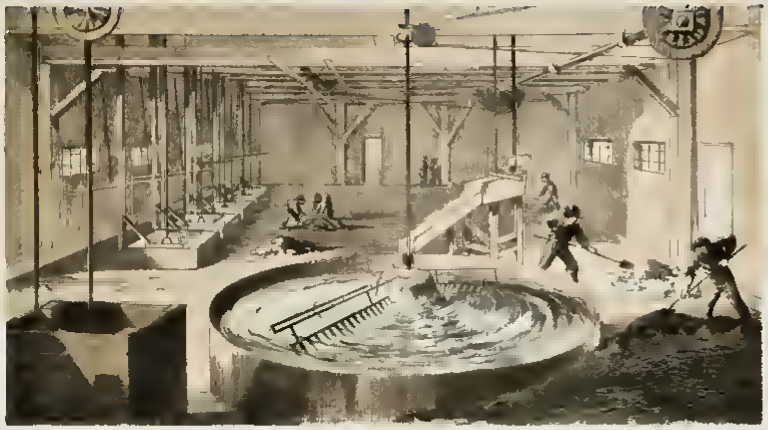
A. E. Mathews, Del.

THE KEITH PROCESS.

HOPE GOLD COMPANY'S WORKS



ORE DRESSING ROOM—THE BUDDLE AND JIGGS

REVERBERATORY FURNACE

CUPEL FURNACE

SCOTCH HEARTHS

Entered according to Act of [illegible] in the year 1866, by A. S. M[illegible] in the Clerk's Office of the Dist[illegible] New York

THE SMELTING PROCESS

JAMES E. LYON & CO'S SMELTING WORKS

PENCIL SKETCHES OF COLORADO.

Colorado is noted for its rich gold and silver mines, the beauty and grandeur of its mountain scenery, and its clear, dry, bracing, and healthful atmosphere. The eastern half of the territory is one extensive plain with numerous streams running down from the mountains, forming the Platte and Arkansas Rivers. A divide, 900 feet higher than Denver, separates the waters of these two streams. The greater part of this plain is covered with grass of a very nourishing quality, and affords excellent pasturage for cattle, horses, and sheep during winter as well as in summer. The dryness of the climate cures the grass, and as rain seldom falls during the latter part of summer, fall, or winter, it retains all its richness. Snow rarely remains on the ground more than two or three days at a time, so that stock can be kept in good condition the entire year. The winters are usually warm and pleasant, remarkably so for the latitude, and farmers plough and sow wheat in January, February and March.

The soil of Colorado is very productive, but on account of the scarcity of rain, except in the mountains, requires irrigating in order to produce crops. The numerous streams running down from the mountains afford excellent facilities for this purpose, and farming, within the last two or three years, has become an extensive and profitable occupation. Wheat, corn and potatoes are the principal crops raised, also all kinds of vegetables that grow in the Eastern States. But few fruit trees have yet been planted. Wild raspberries, gooseberries, whortleberries, currants and strawberries abound in the mountains.

The Sawatch Range runs through the centre of the territory in a serpentine course, sending out numerous spurs, and enclosing four large and beautiful parks, the North, Middle, South, and San Luis Parks. West of these parks the country is mountainous and comparatively unknown.

In reference to the healthfulness of the climate, it is here a well known fact that consumptives and dyspeptics are, in most cases, completely cured in a few months, unless the disease has too firm a hold on the system, and is in its last stage.

In August 1858, a small party, consisting of Georgians, a few men from Kansas, and some half breed Indians, discovered gold on Cherry Creek and on the Platte, three miles above the mouth of Cherry Creek, and made a camp between these two streams. The diggings on the Platte payed but about two dollars a-day to the man. From the results of their labor reports reached the States of gold discoveries and in the fall about 1,500 miners arrived in the spring of 1859 the first permanent settlement was made at Denver.

The country has made extraordinary progress in wealth and population since the first discoveries were made, in spite of the serious drawbacks it has been subject to, and as soon as the railroads extend out, so as to cheapen merchandise, machinery, and provisions, a large number of mines will be worked that will not pay with present prices, and the country will increase in wealth beyond the most sanguine expectations.

Besides the high prices of labor, machinery, and provisions, mining companies have to contend with the refractory nature of the ores, which requires a vast amount of machinery and skilled labor. The sulphurets, which hold the gold of Colorado, are composed of or contain iron pyrites, copper pyrites, galena, zinc, sulphur, arsenic, antimony, &c., so intermixed that they yield but a fraction of their value by the simple crushing, washing, and amalgamating processes that will answer when the gold is "free." Great progress has been made within the past year in overcoming this difficulty, and, no doubt, during the coming year the obstinate nature of the ores will be entirely overcome by some of the various processes now in operation.

DENVER, CITY OF THE PLAINS.

DENVER is situated on the Great American Plains, 5,200 feet above the level of the sea, and within 12 miles of the eastern slope of the Rocky Mountains. In 1865 it contained about 6,500 residents, besides a large floating population. It is the commercial metropolis of Colorado, and the county seat of Arapahoe County. An idea of the vast amount of business done here may be formed from the fact that in 1865 the merchants in the city sold $12,000,000 worth of merchandise.

The soil in the vicinity of Denver is very productive, but, except in a few localities on streams, must be irrigated. Ditches are being dug, which will bring a large extent of territory under cultivation, and greatly increase the wealth of the county.

The principal business part of Denver is not seen in this view, as it lies in the valley of the Platte, but sections of some of the business streets are represented in other sketches. In the valley stretching across the landscape from left to right, and immediately beyond the city, runs the Platte River, it is not, however, seen from the point where this sketch was made, the principal object being to show the eastern slope of the mountains in connection with the city.

Standing on the high ground a mile east of Denver two hundred miles of the eastern slope of the Rocky Mountains can be seen. On the left Pike's Peak, and on the right Long's Peak tower above the surrounding mountains. These peaks are not so high as some others of the main range, but, being at the extremity of spurs jutting out from it, they are more prominent. The view represents but a small section of what can be seen of the eastern slope of the mountains from this point. Long's Peak, near the right, is 50 miles from Denver, and the approximate height, 14,500 feet. The Snowy Range, (Sawatch Range,) is 60 miles distant, portions of it covered with snow rise above the other mountains. This view does not include Pike's Peak.

A little to the left of Long's Peak, and at the edge of the plains, is Saddle Mountain, and three miles north of Saddle Mountain lies the town of Boulder, the county seat of one of the best agricultural counties in the territory. On the left, part of Table Mountain can be seen, and just beyond it lies Golden City. Distance from Denver to Table Mountain, (the nearest part of the mountains,) 12 miles.

So clear and pure is the air on the plains, that the mountains can be distinctly seen 175 miles off. The Rocky Mountains assume new, peculiar, and beautiful features almost every day and hour, according to the condition of the atmosphere and position of the sun. Sometimes on a bright moonlight night, or just before sunrise, the rocks, cañons and trees stand out so distinctly that the mountains appear to be but a mile or two from Denver. In the clear atmosphere of the mountains and plains, objects at all times are seen with such distinctness that persons not familiar with the country are sure to be deceived in regard to distances. When the air is clearer than usual, a most beautiful effect is seen just as the light of the sun has left the western horizon, the horizon is lighted up by a soft, cool, silvery light, caused by the sun shining on the western slope of the snow-covered mountains. The beauty of the sky and clouds in Colorado, especially in summer, rivals that of Italy.

GOLDEN CITY.

GOLDEN CITY, the capital of Colorado, and the county seat of Jefferson County, is situated on Clear Creek, at the foot of the mountains, 14 miles from Denver. Considerable improvement has been made here during the past year, and the prospects for the future growth of the place are very promising. A railroad company has been organized for building a road from Golden City to Central City and Black Hawk, with every prospect of a speedy commencement and completion of the work. This enterprise, in connection with the heavy veins of coal, iron, lime and fireproof clay which have lately been discovered near the town, will insure the building of smelting furnaces and other works for the treatment of gold and silver ores, besides factories, &c. The water-power all along Clear Creek, in this vicinity, is among the best in the territory.

The sketch was taken from the foot of the mountains, looking toward the east. The Table Mountains are seen each side of Clear Creek. Castle Rock, a portion of one of these mountains, is represented on the right. These mountains are 700 feet above Clear Creek, the palisades are 100 feet in perpendicular height.

BLACK HAWK.

In the spring of 1859, parties of miners penetrated into the mountains prospecting for gulch diggings, and the first discovery was made on South Clear Creek Immediately after, a more valuable discovery was made on North Clear Creek, where the town of Black Hawk now stands, a party of miners, while prospecting for gulch diggings, accidentally hit upon the crevice of what is now known as the Gregory Lode, at a point where the quartz came to the surface, and was partially decomposed by the action of the atmosphere, so that the gold could be easily washed from it as in gulch mining This discovery gave a new direction to prospecting, and in a few weeks hundreds of lodes were found, and the adjoining mountains teemed with busy miners Here a settlement was made at a place called Black Hawk Point, from which the town derives its name

The sketch was made from the heights immediately east of the town, looking up Gregory Gulch On the right is Chase s Gulch The first hill on the left of Gregory Gulch is Bob Tail Hill, on this hill the shaft houses of Mr Sensenderfer's mill, the Brastow Mining Company, and the Black Hawk Company are seen The next hill is Gregory Hill, on this hill the Narragansett Gold Mining Company's Works are seen, at the foot of the hill a portion of the Black Hawk Company's Works are represented The third hill of this range is Mammoth Hill, here are seen the Gold Rock Mining Company s Works, and at the foot of this hill a portion of Mountain City can be seen, while a little to the right a glimpse of Central City is had The fourth hill of this range is Quartz Hill, and on the right is Nevada, next to Quartz Hill, and just beyond Nevada is Bald Mountain, and in the distance some peaks of the Snowy Range are seen On a hill in the distance, beyond Central City and to the right of Nevada are the works of the Sierra Madre Gold Mining Company No 1, the Black Hawk Gold Mining Company's Works, 2, Fisk Gold Mining Company s Works, 3, Manhattan Gold Mining Company, 4, Fisher Gold Mining Company, 5, Chicago Gold Mining Company, 6, Empire Gold Mining Company, 7, on the slope of this hill, part of the works of the United States Gold Mining Company are seen The Briggs Gold Mining Company and the Smith and Parmlee Gold Mining Company are in the gulch at the foot of Gregory Hill, and are hidden from view by the point which runs down between Gregory Gulch and Chase s Gulch, as also is the Kip and Buel Gold Mining Company, which is at Mountain City The Ophir Company s Mill is the last building in sight up Chase's Gulch Above this are the Continental Gold Mining Company's Works, Becker s Mill, and the Sterling Gold Mining Company s Works North Clear Creek joins this gulch on the right, and immediately above is the University Gold Mining Company s Mill, J. F Fields' Stamp Mill, Holbrook's Mill, Colorado Ore Reducing Company's Works, Tiger Mill, Black Hawk Company, Mammoth Gold Mining Company's Works, and Mr Sensenderfer's Mill Below Black Hawk, (on the left,) are James E. Lyon & Co 's Smelting Works, Enterprise Mill, New York Gold Mining Company Cañon Gold Mining Company, and the Eight Associate Mill. The building on the hill, just behind the church is a shaft house belonging to the Black Hawk Company, from which a railroad extends down to their works

CENTRAL CITY.

This city is the second in Colorado in point of population and importance, and is the county seat of Gilpin County It was first settled about the same time as Black Hawk, and increased very rapidly in population, although the habitations were at first of the rudest description, consisting of small log huts, tents, and pine boughs spread on poles. By the end of May, 1859, it contained a population of about 8,000, and in June, 15,000 Black Hawk, Mountain City, Central City, and Nevada, are adjoining, forming, in fact, one city Central City lies in such a shape that it is impossible to properly represent it on paper, and these sketches give but an imperfect idea of the size of the place. It is 8,300* feet above the level of the sea, and occupies a central position with regard to the rich lodes that were discovered when the country was first settled It is 38 miles from Denver

In this view looking up Gregory and Eureka Gulches, on the hill just beyond the city, and a little to the left, are the works of the University Gold Mining Company, Gunnell Central Gold Mining Company, Cook Gold Mining Company, and the Gunnell Gold Mining Company The roofs of some of the buildings can be seen On the slope of the next hill, and a little to the left, are the works of the Sierra Madre Gold Mining Company Cook and Kimball's Works are seen at this end of the city, near the bridge

In the view looking up Spring Gulch, Missouri City lies at the head of the gulch, and on the right, in the distance, is Quartz Hill Just beyond the city, and at the foot of Quartz Hill, are the works of the Montana Gold Mining Company; and further up the gulch the works of the Pacific National Company are seen. In Nevada Gulch, which branches off to the right from Spring Gulch, are the Central Gold Mining Company's Works, and immediately this side, the roof of the Columbia Gold Mining Company's Works are seen. The view was taken from the hill side east of the town, and in the rear of the Theatre

* Transactions of the Academy of Science by C. C Barry M. D

NEVADA.

At this place, one and a half miles above Central City, are some of the finest mills in the mountains. The town was first settled about the same time as Black Hawk and Central. The view here is looking up Nevada Gulch, from a point opposite to Quartz Hill, which is seen on the left. Bald Mountain is on the right in the distance. A beautiful view of the Sawatch, or Snowy Range, can be had from this mountain, a sketch of which is given as a frontispiece.

No. 1, Colorado Gold Mining Company's Works; 2, Barroughs' Gold Mining Company's Works; 3, Nevada Gold Mining Company's Works; 4, Kansas-Colorado Gold Mining Company's Works; 5, Gilpin Gold Mining Company's Works; 6, Ophir Gold Mining Company's Works; 7, Philadelphia Gold Mining Company's Work; 8, Quartz Hill Gold Mining Company's Works; 9, Massachusetts Gold Mining Company's Works. On the top of Quartz Hill, towards the left, are the Clark and Gardner Gold Mining Company's Works.

RUSSELL GULCH.

Russell Gulch is two miles from Central, and in the same county. This gulch was discovered in 1860, by Mr. Green Russell, who took out a large amount of gold from the gulch. Several very rich lodes are located here, most of which are being developed and worked. Great improvement has been made in the place within the past year or two. Some peaks of the Snowy Range are seen beyond the head of the gulch, and a little to the right is the top of Bald Mountain. On the right is Quartz Hill, and just this side is the head of Leavenworth Gulch.

No. 1, Eight Associate Mill; 2, Monitor Gold Mining Association; 3, Kay Stone Company; 4, Granada Gold Mining Company; 5, Fairfield Gold Mining Company; 6, Hill Gold Mining Company; 7, some works belonging to the Gold Rock Gold Mining Company; 8, Ford Mining Company; 11, Rochdale Gold Mining Company. On Quartz Hill the works of the Alps Gold Mining Company are seen.

THE CHIEF, SQUAW, AND PAPOOSE.

From Russell Gulch *via* Virginia Cañon to Idaho, it is three miles, and most of the distance is down a steep grade. Near the mouth of this cañon a beautiful view of the Chief, Squaw, and Papoose can be had. These are among the most celebrated mountains in this part of Colorado, east of the "Range," and are situated from five to ten miles south of Idaho. In the engraving the Chief is the most distant mountain, and its summit is considerably above the others. The Papoose is next on the left, and the Squaw to the left of the Papoose and partially hidden by Grass Valley Hill, which lies just beyond Soda Creek. This creek is seen meandering through the valley in the middle distance, joining Clear Creek at Idaho. On the right, part of Soda Hill is seen. On Soda Creek, near its mouth, along the base of Grass Valley Hill, are the well-known Warm Springs. Here are comfortable bath houses for the accommodation of visitors.

IDAHO.

Idaho, the county seat of Clear Creek County, was first settled in the spring of 1859, and is situated on South Clear Creek, seven miles south west of Central City. It was here the first gold discoveries were made after those on Cherry Creek and the Platte. Lately, silver lodes have been discovered near the place, which will give a new impulse to mining. In 1859 and 1860 a large amount of gold was taken out along Clear Creek for several miles.

The view here is looking down the creek. Grass Valley is seen just beyond Idaho, and is in fact, part of the same town; and Grass Valley Hill lies just to the right. Soda Creek joins Clear Creek between Grass Valley and Idaho. Near the town are the Railey Mill, Seaton Gold Mining Company's Mill, and the Lowe Gold Mining Company.

Trail Run joins Clear Creek two miles above. Here are the Phelps and Gilmore Gold Mining Company, Occidental Gold Mining Company, Baltic Gold Mining Company, Colbin Gold Mining Company, Noble Gold Mining Company, Peck Gold Mining Company, and Hale Gold Mining Company.

FALL RIVER.

Two miles and a half above Idaho is Fall River This is the name given to the little cluster of houses at the point where Fall River empties into Clear Creek A store and the post office are located here Mr S Edwards was the first settler, his being the first emigrant wagon that came into the neighborhood. The settlement was made in 1860 The valley at this place is much narrower than it is at any other point from Idaho to Empire, and the mountains are very steep and rugged, so that the scenery is wild and grand. Several natural curiosities in the shape of profiles of the human face are to be seen here, two of the best of which are given on another page The traveller, visiting Colorado, should not fail to stop at this interesting place.

On Clear Creek, below Fall River, are the Phenix Mill, Oro Gold and Silver Mining Company, Silver Spring Gold Mining Company, Whale Gold Mining Company, and Star Gold Mining Company

THE OLD MOUNTAINEER.

The Old Mountaineer is on South Clear Creek, immediately opposite the mouth of Fall River, and stands 254 feet, in perpendicular height, above the level of Clear Creek The profile is eighteen feet in length from the chin to the crown of the head. Openings between the rocks form the eyes and mouth, and a cluster of mountain bushes on the top of the head represents the hair A little mountain shrub growing just in front of the eye contributes much to the general appearance, completing, as it does, the formation of that organ This profile is even a more complete representation of the "human face divine" than the celebrated "Old Man of the Mountain" in the White Mountains of New Hampshire It varies in shape and expression, according to the point from which it is seen, but the best view can be had close to the northern bank of the creek, a little above and nearly opposite the hotel. The artist was the first to discover this natural curiosity

PROFILE ROCK.

This truly comical profile is also near the mouth of Fall River, immediately in rear of the hotel, and is formed by one rock containing numerous seams, jutting out from the point of Profile Mountain. It is 128 feet above Fall River (perpendicular), thirteen feet from the chin to the crown of the head, and ten feet from the chin to the top of the forehead. The rock is eleven feet in thickness at the back part, tapering towards the front. The profile is seen to the best advantage on a moonlight night, or when the sun is hidden behind clouds. The shadow from a projecting rock forms a very good representation of an eye

In going from Fall River to Empire, the traveller will pass through Mill City and Downville, a locality rich in gold lodes. The valley is much wider here than at Fall River, there being ample room for a large town, which it has every promise of becoming at no very distant day The scenery here is beautiful

At Mill City are the Boston and Chicago Gold Mining Company, Mill City Gold Mining Company, and the Downeville Gold Mining Company, and at Downieville the Bullion Gold Mining Company

EMPIRE CITY.

It is beautifully located on the Middle Fork of Clear Creek, within eight miles of the Berthaud Pass, in Clear Creek County The valley here is wide, and the scenery very beautiful The place was first settled in 1860, and since that time has made rapid improvement.

The view was taken near the foot of Silver Mountain, looking towards Georgetown. On the right, just beyond the town, is Lincoln Mountain, and the highest mountain, on the left, is Colfax Mountain, while Douglas Mountain is seen between the two

The following gold mining companies are located at or near the place, most of which are at North Empire, on Silver Mountain, from one to two and a half miles above Bay State Gold Mining Company, Knickerbocker Gold Mining Company, Star Gold Mining Company, Peck Gold Mining Company, Eagle Gold Mining Company, Liebig Gold Mining Company, Humboldt Gold Mining Company, Rosecrans Gold Mining Company, and the Enterprise Gold Mining Company

Georgetown and Elizabethtown are four miles distant by the trail through Union Pass, which is between Lincoln and Douglas Mountains, and six miles by the road around Douglas Mountain

ELIZABETHTOWN.

The description of Elizabethtown, given below, is from a letter by Colonel Hale. In the sketch, Rapublican Mountain is seen on the right, and Burrell Mountain on the opposite side of the valley, near the centre of the view. Georgetown is half a mile down the creek. The view was taken from Griffith Mountain, at the mouth of Griffith Tunnel.

"Elizabethtown is a small mining settlement which has been built up within the past two years. It is one of the most delightfully located spots in the Rocky Mountains, and lies at the terminus of wagon travel in that part of the country. Mining operations have been carried on in the vicinity since 1860, but no systematic efforts were made until the Mount Alpine Company commenced work in 1864. They have erected a fine quartz mill of thirty stamps, and have a splendid water-power sufficient for all their wants at all seasons of the year. Wood is also very abundant, and all mill work can be performed at half the cost incurred in most parts of the territory. The mountains on every side are streaked with veins of silver, and beyond lies the noted district of Argentine. The silver mines have, as yet, been but slightly developed, but a thriving business in that line is anticipated the coming spring. Whenever these are in successful operation, and the contemplated road to Argentine is completed, Elizabethtown will become one of the most important of the smaller mining towns of Colorado."

SOUTH PARK.

In order to visit the South Park it will be advisable to return to Denver, and there take what is called the Turkey Creek Road, an excellent mountain road. On this road, from Mr Parmlee's Ranch until crossing the small branches of the Platte, and again ascending the mountains, the scenery is very fine. Distance from Denver to the entrance to the Park, seventy miles.

The beauty of the South Park is doubly impressed on the mind by the sudden and unexpected manner in which the whole scene bursts upon the view. While ascending a slight rise the traveller is looking directly in front, thinking that he sees the mountain tops on the opposite side of the Park, when the road turns to the right around a hill, and the whole scene is unexpectedly spread out before him.

The Park is 11,000 feet above the level of the sea; and is covered with grass of even a more nourishing quality than that of the plains below, and is capable of sustaining many thousands of cattle in excellent condition the entire year. It is sixty miles in length, and thirty miles wide at the widest part. Only a portion of it is seen in this sketch, as some ridges of low mountains run through it. The large snow covered mountain on the right is called Silver Heels; and Ballie Mountain is next on the left. Immediately this side of Ballie Mountain is the month of Tarryall Gulch, twelve miles distant, where the town of Tarryall is located. Up this gulch, five miles, is the Norris Park Gold Mining Company's Works; considerable gold was taken out of this gulch in 1860 and 1861.

The snow-covered range beyond the Park is a spur from the Sawatch Range, lying between the Park and the head waters of Arkansas River. Some peaks of the Sawatch Range can be seen near the left.

The town of Fairplay is twenty miles across the Park, in a direction a little to the left of Ballie Mountain. At this place are gulch and placer diggings that pay from five to eight dollars per day to the man, but little work is done at present on account of the high prices of provisions and labor. As soon as the advent of a railroad to the territory reduces prices, all the towns in and around the Park will again be swarming with miners.

The following description of the South Park is from the pen of Professor A. Du Bois, of the Colorado Gold Mining Company:

"In 1860 the South Park was discovered to be rich in gold in the form *placers*. The discoverer was an old mountaineer and trapper, known as Buckskin Joe, from the materials of his dress. By common consent the new region received his name. It then comprised a large area, but at present, a single mining village and district is known simply as Buckskin. The South Park is one of four formed by contortions of the great crest of the range, with its immense buttress-like spurs, encircling large areas of comparatively level surface, drained by streams which are the heads of some of our largest rivers. The North Park is the smallest, the Middle Park next, South Park still greater in size, and San Luis, the southernmost and largest of all.

"South Park gives rise to the Platte River. The first view of its wide expanse of prairie dotted with ice covered hillocks, and clothed in luxuriant grasses of soft, varying tints, its meandering streams and its lakelets, all, like a gem deep set in its golden rim of gigantic mountains, whose sombre hue is relieved here and there by the eternal snow, is beautiful as the vision of a dream, and once seen can never be forgotten. Towards the setting sun stands Mount Lincoln, rearing his crest to near seventeen thousand feet above mean tide, and at his foot, southward, upon a crystal-clear and ice-cold stream, in an arm of the Park, between lofty hills, stands the village of Buckskin, looking directly out and down upon Pike's Peak, an hundred miles distant, but in the clear pure air seen as distinctly, apparently, as if but a few miles away.

"The surrounding mountains are crowded with veins, bearing ores surpassingly abundant and rich in gold, silver, and copper. This tempting wealth will ere long fill the region with a large and busy population, and make the village one of world wide fame. In time, too, when the travel hither becomes easy, tourists, artists, and health seekers will throng the Park. The salubrious, invigorating air, the pure, cool water, the cool but equable temperature, the unequalled scenery of mountain and plain, the trout and the game will make the Alps to pale before incomparably greater attractions.

"Of the mines, a few are now but preparing for future work, but, in a year or two, they will tell unmistakably of a great future for Buckskin, and the beautiful mountain oasis, South Park."

MOUNT LINCOLN.

This mountain is the highest in Colorado, and is appropriately named after President Lincoln. It is the culminating point of the various mountain ranges and spurs in Colorado; and at its base the waters of the Platte and Arkansas, which empty their waters into the Gulf of Mexico, and of the Grand, which empties into the Pacific Ocean, take their rise. The approximate height of this mountain is 15,700 feet.* The town of Montgomery, situated near its base, is one of the most promising of the mining towns in Southern Colorado.

From this place it is one and a quarter miles over the Ute Pass to the Pacific slope. This pass is but 1,100 feet higher than Montgomery.

The Pioneer Gold Mining Company's Mill is seen towards the right, and the Pittsburg and Colorado Gold Mining Company's Works are on the hill to the right, and beyond the town.

Buckskin, the county seat of Park County, is eight miles from Montgomery, and it will be necessary to return about four miles on the Fairplay road, and then turn to the right, and follow up Buckskin Gulch. The scenery at Buckskin is grand and beautiful. The following mining companies are located here: Colorado Gold Mining Company, of Philadelphia; American Exploring Company, of Philadelphia; Colorado Gold and Silver Mining Company; Exploring Company, of Pennsylvania; and South Park Gold Mining Company.

Sterling is in the adjoining gulch, one and a half miles by the trail from Buckskin. This place is beautifully located, and is destined to become a thriving mining town, as the lodes here will compare favorably with any in the territory. Several mining companies are about to commence operations.

From Sterling, there is a pony trail over the spur of the range which divides the head waters of the Platte and Arkansas, to Oro City, California Gulch, fourteen miles; by the wagon road it is much further. Soon after the gulch was discovered, Oro City contained a large population, and a very large amount of gold was taken out, which goes to show that rich lodes exist in the range or spur from the range at the head of the gulch. Oro City is the county seat of Lake County.

Colorado Gulch lies six miles from California Gulch, on the opposite side of the Arkansas. A sketch of this gulch is given in illustrating the various mining processes. It was discovered in July, 1864, by McCannon & Co. Only a small portion of the gulch has been worked, but about $100,000 have been taken out. Twelve miles below are the Twin Lakes.

TWIN LAKES.

One may travel the world over without seeing a more beautiful spot than this. These lakes are just at the foot of the Sawatch Range, the largest is three and a half miles in length, and one and a half miles wide, while the smallest or upper lake is one and a half miles long, and about the same width. They are divided by a narrow strip of land, about a quarter of a mile wide, and are supplied with water by a pure mountain stream which runs down the gulch from the mountains. This stream runs through the entire length of the lakes, and empties into the Arkansas, one and a half miles from the foot of the lower lake. Just after sunrise, of a clear morning, a beautiful effect of the sunlight on the slightly rippling waters of this stream is seen from the head of the Lakes, its course through their entire length being marked by a long silvery light, while the waters everywhere else are as smooth and glassy as a mirror. These Lakes abound in trout, of the salmon variety. The sketch was made from a point near the outlet. A town has been laid out near the upper lake, called Twin Lakes, which on account of the natural advantages of the location, is destined to be a thriving place, and one of the most popular summer resorts in the West. A rich belt of lodes extend across the gulch above, and the creek affords numerous and excellent water power. Twelve miles up this gulch is the celebrated Red Mountain. The pyrites of iron in this mountain is very rich in gold and silver, and is found near the surface.

From Twin Lakes to Colorado City the distance is about one hundred and fifteen miles, and the road excellent.

PIKE'S PEAK AND COLORADO CITY.

Colorado City is the county seat of El Paso County, one of the first agricultural counties in the territory. It is located at the base of Pike's Peak, on the *Fontaine qui Bouille*, (Boiling Fountain,) and at the foot of the eastern slope of the mountains. The country in the vicinity of Colorado City is remarkable for its novelty and beauty. The Soda Springs, three miles above, are destined to be a favorite summer resort.

The altitude of Pike's Peak is 14,9254 feet, and the distance from Colorado City to its summit, air line, fifteen miles.

*The height of Mount Lincoln has been given by different parties at various figures, ranging from 15,000 to 17,000.

†Transactions of the Academy of Science by C. C. Berry, M. D.

GARDEN OF THE GODS.

Two miles from Colorado City is the Garden of the Gods, very appropriately named Most of the rocks here are of a bright red color, others are grey and a few white Each of these colors lends brilliancy to the others, and the whole is relieved by the bright green grass dotted with beautiful wild flowers, and dark pines. The rocks it will be seen are peculiarly shaped, and stand up like monuments.

MONUMENTS NEAR MONUMENT CREEK.

The curious and beautiful in nature are here combined in a most pleasing manner Monument Creek runs almost parallel with the eastern slope of the mountain, and at the point where the monuments in the sketch are shown, it is about six miles from its base These monuments are to be seen on the slopes of the ridges which run down from the mountains, and, in returning to Denver, are first seen about five miles from Colorado City The sketch represents monuments near Mr Coplen's Ranch, eight miles from that place

These monuments are formed out of a kind of native "grout," consisting of gravel, coarse sand, and a little clay, and are of a light color The surface was, at one time, even with the top of the monuments, and in places, was hardened by being exposed to the sun. These hard spots served as a protection to the mixture beneath, while the action of the elements gradually washed the rest away, which was also, perhaps, less firmly cemented together Soft streaks of this composition, running in a horizontal direction, cause these monuments to assume a variety of curious shapes. Some look like sibley tents, and those that show themselves between trees suggest a vast encampment of soldiers in groves of pine, others look like ladies with broad hats on. Then there are representations of vases, urns, bells and pyramids, some of the latter being inverted.

MINING AND MINING PROCESSES.

GULCH MINING—CALIFORNIA GULCH.

Gulch mines, including bar and placer mines, are such as are formed by the washing of gold, together with the soil formed by the disintegration of the rocks, down into the ravines and valleys, where it finds a lodging place.

The most common mode of working these mines is by "sluicing." Sluices are long troughs, sometimes a quarter of a mile, or even more, in length, made of boards with slats nailed across the bottom, so as to form riffles on which the gold may lodge. A dam is constructed at the head of this sluice into which water is conveyed. This dam rests on what is called the "bed-rock," on which most of the gold is found. The soil is dug down into this dam, three men are usually employed, one to dig down the soil, one to stir up the mass with a rake so that the earth may be carried away in the water, and the other to throw out the stones with a fork. As the gold is heavier than rocks, earth, or water, it settles to the bottom and lodges there.

The gold in the bottom of this dam is scraped up every few days, as the work progresses, and the sluice box extended. Quicksilver is thrown into the sluice to catch the finer particles of gold. After being scraped together, the sand, gravel, &c., is washed from the gold in tubs and pans. It is then retorted, to separate the quicksilver from the gold, as described in the stamp process.

A SPANISH ARASTRA.

For all the gold found in gulches, bars, and river beds, there must be a source, that source is the lodes, and of course the gold here must be more abundant than in the gulches below.

Lodes, vulgarly called leads and ledges, are fissures in the rocky crust of the earth, which have been opened and afterwards filled with the ores they contain, probably by injection from below. In Colorado, they vary in width, from a few inches to many feet, occasionally they occur twenty feet wide, or even more; but as a general rule, the narrower veins are the richer ones. Usually they descend nearly perpendicularly.

The quartz in these lodes, near the surface, is partially decomposed by the atmosphere, and has a yellowish red tinge. Sometimes this quartz extends down fifty feet, more or less, before running into pyrites of iron. The gold is often taken from this surface quartz by the Spanish *arastra* (dragger, from the Spanish verb *arastrar*, to drag). This machine is very simple, and has been in use by the Spaniards for ages. It consists of a large tub or vat with a stone bottom, in the centre of which is a shaft, with a cross beam, to which large rocks are attached.

The quartz, after being conveyed to the spot, is shoveled into this tub, which is supplied with water by a spout or small trough. The shaft is made to revolve by water-power, and the rocks, as they are dragged around, pulverize the quartz, which is carried off with the water by a spout near the top of the tub; the gold settling to the bottom. Quicksilver is placed in the bottom to attract the fine particles of gold.

In "cleaning up," the gold and quicksilver, called "amalgam," is scraped up and the impurities washed from it in pans, and it is then ready for the retort.

THE STAMP PROCESS.

The ore in the lodes which is below the surface quartz is very hard, and is composed of, or contains iron pyrites, copper pyrites, galena, zinc, sulphur, arsenic, antimony, &c., as before explained By the stamp process for treating these ores it is supposed only about twenty-five per cent. of the gold is saved, on account of the presence of the sulphurets.

The engraving represents Mr Sensenderfer's mill on North Clear Creek, just above Black Hawk, which is driven by water power The machinery consists of a heavy frame, the lower part of which is boxed in with thick plank, the bed of this, in which heavy stamps play, is of thick iron, through the length of this frame, near the top, an iron shaft extends, called the cam-shaft, to this shaft, arms are attached, called cams, which, by revolving, raise the stamps and let them drop, thereby crushing the ore, the box is kept nearly full of water, and is supplied by a pipe leading from the tank, the ore is put in from the rear, and as it becomes pulverized, the water carries it through little holes perforated in the iron plate in front, and over copper tables; these copper tables are covered with quicksilver which catches gold that may not have settled in the box, and the useless material, with the gold that is not caught by the quicksilver, passes off with the water The amalgam of gold and quicksilver is usually cleaned up twice a week, and is scraped off the tables with buckskin. It is then washed out in a pan to free it from sand, dirt, and other impurities, then ground in a mortar and softened a little at the same time with quicksilver, It is then "flooded," that is, more quicksilver is added, so that all useless substances come to the surface and are skimmed off The quicksilver is then strained out with a heavy piece of canvass or buckskin, leaving the amalgam in balls of from thirty to forty ounces, which is then ready for the retort. The retort is an iron vessel with a long pipe, into this vessel the amalgam is put, the cover screwed down, and fire put into the furnace below, by which means the quicksilver is converted into vapor and passes out through the pipe, but on the way is re-converted into its natural condition by contact with the cold pipe, on the outside of which wet rags are kept. After the quicksilver has been taken from the gold in this way, it is then ready for shipment.

SHAFT MINING.

This engraving represents the interior of No 1, of the Gregory lode, and belongs to the Black Hawk Company The depth of this shaft is three hundred and fifty feet, its width from four to six feet. Men are seen drilling holes, for blasting, others shovelling the ore to the shaft, where it is hoisted by steam power and conveyed to the mill Sometimes the ore is so hard that it takes two men a day to drill for one blast. Usually, however, two men can drill three holes in one day. When these holes are sufficiently deep, a cartridge containing powder, with a fuse attached is put in, the fuse lighted, and the men go below the scaffolding while the explosion takes place. Work is carried on night and day by two sets of workmen, called the "day shift," and the "night-shift" In shaft or lode mining the ore generally becomes richer as the depth increases.

THE KEITH PROCESS.

Through the politeness of Mr Keith, the inventor of this well known and successful process, the author was furnished with all desired information to describe its *modus operandi* The mill, from which the sketches were taken, is owned by the Hope Gold Company, and is situated on the Gold Dirt Lode, Gilpin County The works of the company are under the supervision of Colonel C L Graffin

THE ORE BREAKING ROOM—BLAKE'S ORE BREAKER

After having been conveyed from the mine to the ore breaking room, the ore is placed, by the man known as the "feeder," into the ore breaker, where it is broken into small pieces about the size of a hazel nut, and smaller, from thence it passes to the pulverizer immediately beneath, on the same floor with the furnace The pulverizer is a cylinder of iron, inside of which are iron balls two inches in diameter This cylinder revolves at a speed of twenty revolutions a minute It is fed at the shaft, and discharges the pulverized ore at the circumference, it being finely pulverized by the action of the balls.

THE FURNACE

From the pulverizer the pulverized ore is conveyed by machinery to the drying table A; thence by the "conveyer" D and elevator E into a hopper upon the floor above; thence through the pipe B into a "blow-pipe" C The current of air created by the "fan blower" F carries the ore into the furnace, passing directly *into* the flame generated in the "fireplace" G In this way the ore is ignited, passing along through the furnace, filling it with a most brilliant flame composed of the particles of ore in a vivid state of combustion. The ore thus freed from its sulphur and

other volatile portions, falls into the "collecting chamber" beneath. The ore is withdrawn and cooled in

THE ORE PIT

This is a dark room lined with brick. As the ore comes out of the collecting chamber, through little doors seen on the left, it is carried up by the elevator on the left, and thrown on the piece of sheet-iron near the opening in the ceiling, and falls to the floor in a shower, cooling as it falls. The elevator on the right then conveys the ore to another smaller pulverizer, from whence it runs with water to the "shaking tables" in

THE AMALGAMATING ROOM

The shaking tables have a vibrating motion longitudinally, thus bringing the fine gold mixed with the ore, in contact with the amalgamated copper surface of the table, and with the quicksilver placed in the "riffles." The riffles are made by corrugating the copper plate which forms the bottom of the table

The shaking tables are "cleaned up" three times each week, the "amalgam" of gold separated from the quicksilver by straining through strong heavy cloth, canvass or buckskin, and the complete seperation is accomplished by cupelling, as before described in the stamp process

THE SMELTING PROCESS.

JAMES E. LYON & CO'S SMELTING WORKS

After the ore is hauled in wagons to the crushing room, it is first cracked into pieces the size of a hickory nut and smaller, by dodge crackers, and then conveyed by an elevator to a hopper, which discharges it between the cornish rollers. Most of it is pulverized sufficiently fine to pass through a seive, so arranged underneath as to carry the coarser particles back into the hopper, and again between the rollers, until thoroughly pulverized. Thence it is conveyed into the

ORE DRESSING ROOM

Here the mineral is separated from the superfluous rock. The following description is from the *Mining Journal*:

"The material as it generally comes from the vein is sorted into three classes. The first, containing the nearly pure mineral, is picked out in the crushing room and taken without dressing to the desulphurizing furnace. The second and third are reduced sixty per cent. in bulk without decreasing their value; in other words, three tons, worth fifty dollars per ton, are dressed to one ton, worth one hundred and fifty dollars. Heretofore it has been customary to handle sixty per cent of worthless material to get fifteen per cent of the contents of the other forty. The second and third classes, as they come from the crushing room, are washed, and then dressed in jiggers, which handle from four and a half to five tons per day each. They are boxes four feet long by two wide, and about eight or ten inches deep, with copper bottoms punched like a coarse seive. [In the engraving they are shown on the left.] They are arranged in a frame over a vat of water, so that they can be lowered and raised, and by a connection with the fine shafting receive a rapid vertical motion in the water, which, as the box of ore goes down, washes up the light particles (chiefly rock and sand) while the mineral settles through the seive into the valuable pure. From the vat it is shoveled into a miniature tossing seive, where it receives its final dressing. All the rock and sand is removed and the ore finally reduced without perceptibly decreasing its value to about one third of its original bulk. This last operation is a very ingenious and simple one, and consists in shoveling the ore slowly into a tank about half full of water, to which a rapid rotary motion is given with the blade of a shovel, when sufficient material has been thrown in to raise the water to the top of the cask, it is tapped lightly and quickly on the edge with an iron bar, producing a jarring motion counter to the rotary, bringing the sand and sediment to the surface and settling the mineral, perfectly pure in the bottom, whence it is removed and the operation repeated *ad infinitum*.

"In the west end of the building is a Cornish Buddle, [seen in the foreground] which is used for dressing tailings. It is a large tub twenty feet in diameter, about twenty or twenty-four inches deep with a convex bottom. In the centre is a post upon the top of which are fixed two arms six or eight feet in length. There are a series of brushes on the under side of each arm. These revolve slowly, and the tailings are fed upon the centre of the buddle with a small stream of water. The motion of the brushes and the specific gravity of the particles immediately determine their value and position, the heavy metallic portions settling down next to the post, the light ores being carried by each successive revolution of the brushes toward the rim of the tub, next to which the sand finally settles. The mineral is taken out around the centre as fast as the buddle is filled, the sand thrown away and the operation repeated. The ores are now ready for desulphurization.

"This treatment is administered in a building adjoining the smelting room, and in an immense reverberatory furnace, capable of receiving five tons at a charge. The dressed ores are spread evenly on the floor of the furnace, and fire applied until the sulphur is ignited. Constant stirring is required to bring all of the material in contact with the heat. A few hours suffices to burn off the sulphur and transform the bright cubical pyrites into a brownish powder, nearly free from impurity. This residum passes from the furnace directly to the floor of the smelting room."

REVERBERATORY FURNACE.

"Here are two large reverberatory furnaces, built in the most substantial manner, lined throughout with fire brick, heavily ironed and braced. They connect in common with the desulphurizing furnace directly with a large flue two hundred and seventy five feet or more in length running up the side of the mountain attaining a perpendicular height of one hundred and fifty feet, terminating in a low chimney from which the fumes and all the noxious vapors liberated from the ores, escape. The smelting furnaces are about eighteen feet in length by twelve in width, and capable of reciving from six to eight tons each of dressed ores per day, equal to from eighteen to twenty four tons of material as it comes from the mine.

[One of these furnaces only is represented in the sketch.]

"Their floors are so laid that if water were ponred on them at any point it would flow to the tap holes, which face each other, the doors for feeding and stirring being on the opposite and outer sides. It is necessary that the workmanship and material of these structures should be of the very best character to withstand the tremendous heat to which they are subjected, as upon them and the care taken in heating and cooling, the duration and efficiency of the furnace entirely depends. The roofs are almost flat and so arched as to distribute the flame evenly over the entire area of the floor, two or three feet beneath which, a flat arch is turned and a large space between

the side walls left open for an ash-pit and to allow a free circulation of air. A charge consists of three thousand to three thousand five hundred pounds of desulphurized ores, mixed with such fluxes as are necessary for their reduction. It is shovelled rapidly into the furnace, spread evenly over the floor, the doors closed, hermetically sealed with clay, and the fire turned on. As soon as the mass begins to melt, a bleeding bar is inserted in the tap and the accumulating lead allowed to drip out into an iron kettle which is kept hot by a coal fire. In course of five hours, after several stirrings or ravellings with a long iron rake, the whole mass becomes liquified and presents the appearance of a bubbling, seething sheet of liquid fire. Nothing in the form of metal can withstand such a heat.—Whatever sulphur or other impurities may have remained in the ore, are caught by the fluxes and carried into the slag, which is of the consistency of water. The lead alone, as an amalgam to the gold and silver, passes down through the slag, drips out into the kettle with its riches, and when the tap is opened and the fiery flood rushes out and cools, the slag is found to be clear and glassy, the kettle containing the lead loaded with gold and silver. This is dipped out, run into bar moulds, cooled, and stacked up for the final operation of

THE CUPEL FURNACE.

"There are two of these connected with one stack, through which they obtain their draft. Between the fire grate and the stack is a sort of bridge, under which the *test* is placed and adjusted very like an engineer's instrument, with four leveling screws which admit of any elevation or angle of depression that may be required. The capacity of these furnaces is about five tons of lead each per day. The tests of cupels are made by pounding prepared bone ash into an oval, iron ring, three feet by four and five or six inches deep. When the ring is full, a hollow is moulded in one face, like a wash basin, a hole cut through the bone ash at one end, next to the ring and a small groove cut in the edge to carry off the stream of litharge, which is not allowed to touch the iron, having a radical tendency to eat it. The flame passes over the test, into which the bars of lead are introduced one by one, from a slide, melting in the heat and dropping into the basin. A light blast of air is introduced at the same time. This, coming in contact with the surface of molten lead, rapidly oxydizes it, and the vitrified oxyd or litharge passes off in the opposite side of the test. When it is desired to take out the bullion, the supply of lead is stopped, and by means of the adjusting screws the test is tipped down gradually, the blast and heat being continued until the last particle of litharge passes off, leaving the cake or button of gold and silver in the bottom of the test."

"Such is the method by which these works are daily reducing with perfect success all the refractory, pyritic ores of Colorado."

THE SCOTCH HEARTHS.

"The treatment of lead ores, which generally contain a large percentage of silver is even more simple. They are dressed to seventy per cent. clear lead, and melted down without fluxes, in queer little fire places, called Scotch Hearths, more properly American Hearths, by which name they are known abroad. They are open in front, have sheet iron stacks and a blast pipe entering the back side of them. A fire is kindled with short, dry wood, the ore thrown on the wood and the blast started. The ore is soon reduced to metallic lead and runs through a little groove in the hearth into an iron kettle carrying its riches with it. Thence it is dipped out and run into bars for cupellation, and supplies the greater part of the litharge used as a flux in the reverberatory furnaces. The capacity of the hearths is about two and a half tons each per day."

Five of these hearths are in a circle, their chimnies running into the same flue

SNOWY RANGE OF THE ROCKY MOUNTAINS,

FROM BALD MOUNTAIN, NEAR NEVADA.